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A Comparison Between Web Enhancer Learners and Blended Learners in Flipped Classroom: A Quasi-Experimental Approach

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Article Information

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Abstract

Blended learning integrates technologies in classroom activities. This development is considered as a strategic approach for digital native generation. The exposure of the technology to this generation since the early age requires a new approach to leverage their capabilities in learning. Currently, in Malaysia, the education landscape promotes various approaches related with blended learning including flipped classroom. This situation indirectly confirms that there is no traditional learning in the universities, especially in the public universities. Unfortunately, most of the studies about online learning made comparison between online learning and traditional learning. Little of these studies focus about the differences of online interaction exposure has impact on students. Hence this aim of study is to investigate the significant differences of online exposures among students in blended learning environment. Data were collected using non-randomized quasi experimental approach among business students in a public university in Malaysia. Data analysis shows a mix result where there were significant differences between groups for satisfaction, effectiveness, efficiency and student interactions. However, there were no significant difference for student engagement and final result for both of the studied groups. Conclusion and recommendation also discussed in this article.

INTRODUCTION

The evolution of technology in learning creates more opportunities in the mode of delivery in teaching and learning activities, thus learning not only limited to the traditional classroom only. In Malaysia, e-learning refers to the blending of information technology and communication to assist these activities (MOHE, 2011). Another author defined blended learning as a form of the traditional learning and online learning (Horn & Staker, 2011) that offers a new way to handle the struggle between content and learning capabilities (Weimer, 2014). One of the implementation of blended learning is flipped classroom. This approach combines dual teaching modalities namely face to face and online learning (Bristol, 2014). Thus, the flipped approach complements student centred learning, and empowered self-regulated learning.

Majority of students in the tertiary education are millennial generation. This generation, also known as the digital natives, are used to the information technology devices such as mobile phones, smartphones, and tablets since their early age (Economides, 2013). As for that, they are able to listen to the podcasting, reading through online material and streaming content using videos more effectively as compared to their previous generations. Because of these characteristics, the integration of various teaching modalities is seen as an essential teaching approach in education for this era.

Allen and Seaman (2010) define type of learners based on the percentage of online activities exposed in the classroom. There are four types of learners, namely; traditional, web enhancers, blended and online. Traditional learners do not integrate online learning in their classroom. Web enhancer learners refer to the students who have 0% to 29% of online interactions, whereas blended learners have the exposure of 30% to 79% and those who received more than 80% of the online interactions are considered as online learners. In Malaysia, majority of the universities integrate learning management system (LMS) in their teaching and learning in which implies that students of these universities either belong to the web enhancer learners or blended learners depending on their exposure to the online interactions.

So far little is known about the differentiation between web enhancer learners and blended learners because majority of previous literatures of blended learning focus on the differentiation between traditional learners and online learners (Connolly, MacArthur, Stansfield, & McLellan, 2007a; Davies & Graff, 2005). Hence, this study will focus on the differentiation of online interactions exposed to students in the flipped classroom between web enhancer learners and blended learners. In doing this, six variables were tested in this study which are satisfaction, effectiveness, efficiency, student interaction, student engagement and final result.

LITERATURE REVIEW

Satisfaction in education is essential as it reflects the quality of the program offered by universities (Kuo, Walker, Schroder, & Belland, 2014). One of the factors that contribute to the satisfaction of blended learning in universities is information technology and classroom facilities. In order to improve the performance of digital natives learners (Economides, 2013), the integrations of technology in their learning environments is required, (So & Brush, 2008).

In education, satisfaction alone is insufficient quality factor to measure blended learning because students must be able to complete the assessments and sit for final examination (if required) in order to ensure their candidature in the university. These important components are measured using effectiveness and efficiency. Effectiveness measures the completeness of assessments by students in order to achieve their desired result (Aspiazu, 2013). While efficiency refers to situations where students are able to complete the assessments given in the specified timeframe (Alnanih, Ormandjieva, & Radhakrishnan, 2013). In addition, the final result also has been used as the performance indicators among students (Connolly et al., 2007).

Apart from the variables discussed in the earlier section, factors related to students learning like learning engagement and student interactions, have huge impact in achieving learning goals (Ally, 2005; Anderson, 2005; Gilbert, Morton, & Rowley, 2007). Previous studies revealed that the performance of students who were engaged with the system is better than those who were not (Junco, Heibergert, & Loken, 2011). In addition, students also prefer to have more interactions with their instructors, especially if it relates to their assessments (Gilbert et al., 2007). The online interactions are very important since members of the online can get for their learning activities (Dixon, 2010).

Hence, the hypotheses for this study are as follow:

- H1: there is a significant difference in satisfaction among treatment group and control group in flipped classroom
- H2: there is a significant difference in effectiveness among treatment group and control group in flipped classroom
- H3: there is a significant difference in efficiency among treatment group and control group in flipped classroom
- H4: there is a significant difference in student interaction among treatment group and control group in flipped classroom
- H5: there is a significant difference in student engagement among treatment group and control group in flipped classroom
- H6: there is a significant difference in final exam result among treatment group and control group in flipped classroom

METHODOLOGY

Objective

The objective of this is to access whether the increment of online activities exposure in blended learning course had different effects on satisfaction, effectiveness, efficiency, student interaction, student engagement and final result among web enhancer learners and blended learners in flipped classroom.

Design

This study employed a quasi-experimental, non-randomized, two groups with pre-test and post-test design. The authors' assigned one group as blended learners (treatment group) and another group as web-enhancer learners (control group).

Context

The study was conducted at a public university in Malaysia. Fundamental of Entrepreneurship subject was selected because the syllabus for this subject allows instructor to include blended learning (such as flipped classroom) as one of the methods in teaching. However the instructors must take note that the number of hours for the activities must not exceed 30% of allocation time for non-face-to-face activities as mentioned in Student Learning Time (SLT).

This subject is a compulsory subject for every students of the university. This course has been consistently revised to accommodate the contemporary issues in the area. Since the semester of June 2012, some changes have been made to the syllabus such as reducing contact hour for face-to-face activities from 4 hours a week to 3 hours a week. Because of this, the instructors for this course are facing problems in completing the assessments as well as teaching and learning activities within the stipulated time. The average number of enrolments of 900 students per semester added new issue with the number of limited instructors available in the faculty. Hence, a new approach of teaching has been incorporated in the teaching and learning activities for this course. A flipped classroom has been introduced for this subject in the semester of June 2012.

Participants

The inclusion criteria for this study were students in semester 6 from Faculty of Business Management (Diploma in Business Studies) and who have enrolled for Fundamental of Entrepreneurship (ENT300) course for the semester 2015 (Dec 2014 to Mar 2015). There were 52 students involved in this study. 22 of them were assigned as web enhancer learners and the remaining of the students were assigned as blended learners. In this subject, students had been exposed to the technique of developing a business plan. Students prepared a business plan in a group of five. Since the business plan is a long report, students were required to submit five progress reports to ensure that they understand the content of the subject and able to apply their understanding in their report. Apart from that, students also need to present their business plan using e-poster. Another component of the subject's continuous assessment is mid semester examination. At the end of the semester, students sat for their final examination.

Flipped Classroom

Students in the flipped classroom accessed online contents provided by the instructors from learning management system. The online contents uploaded are scheme of work (SOW) that detailed out activities of the subject for 14 weeks, notes, guideline for preparing a business plan, a business plan template, samples of business plan report, instructions on how to prepare e-poster, information about presentation schedule and information related to mid semester examination. In order to centralize these information, one instructor was appointed as lecturer in charge (LIC) to control the dissemination of the related information. However, other instructors who planned to opt for blended learning were able to provide more online content using their own folder for their groups. Also, these instructors were permitted to use other platforms such as social network site (Facebook) and mobile application (WhatsApp) to encourage student interactions with instructors.

For the purpose of this study, the author assigned one group to represent web enhancer learners. Web enhancer learners accessed online content provided by LIC through learning management system. Lectures and tutorials were conducted face to face. Online content were utilised by students as a hub to access information related to the subjects. Another group was assigned as blended learners group. Blended learners received lectures face to face. However, two hours of the tutorial classes were conducted online.

Data Collection

Prior to the data collection, students were divided into two groups depending on the percentage of online interactions exposed to them. Web enhancer learners were exposed to 14% of online interaction as compared to

42% of online interactions for blended learners. Refer to Table 1 for detail activities. The percentage of online interaction was calculated based on the equation 1:

$$\% \text{ of online interaction} = (\text{no of weeks exposed to online interactions} / \text{total weeks}) \times 100 \quad (1)$$

Data were collected from week 6 (January 2015) to week 12 (March 2015). Week 6 has been chosen because the finalized class lists had been generated after add-drop session. Students were informed about the experiment activities. Students were given questions about their motivation associated with blended learning. In week 7, the tutorial class for the treatment group has been shifted to online discussion. For the control group, the class were conducted as usual. In week 8, students were asked to answer pre-test questionnaires that consist of the measured variable for this study namely satisfaction, effectiveness, efficiencies, student interactions and student engagement. For this week, the tutorial class was conducted using face to face method.

In week 9, the tutorial class for the treatment group was shifted to online discussion once again, while tutorial class for the control group was conducted using face-to-face method. In week 10, students started the preparation for oral presentation. Students for both groups relied heavily on the online content for their assessment. Tutorial class for both group was shifted to consultation and online discussion. Students presented their business plan in week 11. In the following week, students were asked to answer post-test questionnaires. Please refer to Table 1.

TABLE I
DATA COLLECTION AND QUASI-EXPERIMENTAL ACTIVITIES

Week	Descriptions	Activities	
		Treatment Group (Blended Learners)	Control Group (Web Enhancers)
1 to 5	Class list finalized at the end of Week 5 Tutorial class for both groups conducted using face-to-face mode	Registration and add-drop session Tutorial in Face-to-face class	
6	Pre-experimental test measured using motivation scale Tutorial class for both groups were conducted using face-to-face mode	Experimental briefing & pre-experimental test Tutorial in Face-to-face class	
7	Tutorial class were conducted differently between groups	Tutorial using Online discussion	Tutorial in Face-to-face class
8	Time 1: Pre-test was employed. Tutorial class for both groups were conducted using face-to-face mode	Time 1: Pre-test Tutorial in Face-to-face class	
9	Tutorial class were conducted differently between groups	Tutorial using Online discussion	Tutorial in Face-to-face class
10	Tutorial class for both groups were conducted using consultation face-to-face and online discussion for both groups	Tutorial using consultation and online discussion	
11	Presentation of business plan were conducted centralized for ENT300 students enrolled for this semester.	Presentation of business plan	
12	Time 2: Post-test was employed using similar measurement in Pre-test Tutorial class for both groups were conducted using face-to-face mode	Time 2: Post-test Tutorial in Face-to-face class	

Measurement

Pre-test and post-test questionnaires consisted of the same measurement so as to avoid the internal validity issue related with quasi experimentation. Satisfaction and student interaction measurement were adapted from Kuo, Walker, Schroder, & Belland (2014). While measurement for effectiveness and efficiency were adapted from Finstad (2010). The authors adapted measurement for students engagement from Dixson (2010). Finally, measurement for motivation was adapted from Sørebo, Halvari, Gulli, and Kristiansen (2009). Final results were obtained from the faculty after the results were released to students. The final result consists of continuous assessment and final examination result. All continuous items are measured using 6 point Likert scale ranging from '1' refers to 'strongly disagree' to '6' refers to 'strongly agree'. In order to improve the content validity, the authors requested one professor, one senior lecturer and three students to review the questionnaires. Amendments had been made before the final copy of the questionnaires were distributed.

Approval and consent

Approval for the study and experiment procedure were obtained from the dean of the faculty and assistant rector (academic) of the branch campus. All students were informed about this study.

Data analysis

Data were analysed using SPSS version 21.

RESULT AND DISCUSSION

Selecting participants

Prior to selecting participants for this study, the authors must ensure that the characteristics of the groups must be similar. All participants were from semester 6, Diploma in Business Studies students and who have passed the pre-requirements for Fundamental of Entrepreneurship subject. Apart from that, the authors also conducted a motivation test. An independent t-test was conducted to compare the motivation score between web enhancer learners and blended learners. The result exhibits no significant difference in score between web enhancers ($M=3.56$, $SD = 0.74$) and blended learners ($M=3.64$, $SD = 0.94$); $t(50) = 0.91$, $p > 0.05$. This result indicates that prior to conducting the study, both groups were indifferent in terms of characteristics and motivation.

Pre-testing effects

One of the major internal validity threat in quasi experimental is pre-testing effects. The pre-testing effect was analysed using multivariate analysis of variance. The result indicates that students who were exposed to pre-test at Time 1 had no significant effect on data collected at post-test Time 2. The result of Box's M Test multivariate homogeneity of variance-covariance matrices shows the insignificant value ($p = 0.319$) for this analysis. This result indicates that within-group covariance matrices are equal and the research design is balanced in which, there is an equal number of observations in each cell of the data set. Hence, the test had ruling out the major threat of internal validity for this study.

Descriptive statistics

Table 2 below presents the descriptive statistics for measured variables for pre-test (Time 1) and post-test (Time 2). Result indicates that all means for post-test is higher when compared to mean for pre-test. The standard deviation value also improved in post-test as compared to previous test.

TABLE 2
DESCRIPTIVE STATISTICS FOR PRE-TEST AND POST-TEST

No	Variables	Type of Test	Mean	SD
1	Satisfaction	Pre-test	3.53	1.21
		Post-test	5.49	0.38
2	Efficiency	Pre-test	2.99	1.13
		Post-test	5.18	0.60
3	Effectiveness	Pre-test	2.99	1.18
		Post-test	5.09	0.64
4	Student Interaction	Pre-test	3.19	0.98
		Post-test	5.28	0.45
5	Student Engagement	Pre-test	3.06	1.18
		Post-test	5.91	0.60
6	Final Result	Post-test only	73.97	7.60

Table 3 exhibits the descriptive statistic among web enhancer learners and blended learners based on post-test result. The result indicates that the mean of the blended learners groups are higher (5.27 to 5.59) when compared to web enhancer learners (4.86 to 5.37) for all measured variables. The standard deviation for blended learners are between 0.33 to 0.52, and web enhancer learners are ranging from 0.39 to 0.78.

TABLE 3
DESCRIPTIVE STATISTICS FOR WEB ENHANCER LEARNERS AND BLENDED LEARNERS (POST-TEST)

No	Variables	Type of Learner	Mean	SD
1	Satisfaction	Web Enhancer	5.37	0.39
		Blended	5.59	0.37
2	Efficiency	Web Enhancer	4.98	0.69
		Blended	5.33	0.49
3	Effectiveness	Web Enhancer	4.87	0.71
		Blended	5.27	0.52
4	Student Interaction	Web Enhancer	5.07	0.51
		Blended	5.42	0.34
5	Student Engagement	Web Enhancer	5.09	0.78
		Blended	5.27	0.42
6	Final Result	Web Enhancer	73.5	9.40
		Blended	74.3	6.04

Hypotheses testing

In order to test hypotheses of this study, the authors analysed the data using independent t-test. The result exhibits in Table 4 below. The results indicate that there is a significant difference between web enhancer learners and blended learners in satisfaction of exposing to the online activities in flipped classrooms, $t(44) = -2.020$, $p < 0.05$ thus supporting hypothesis 1. Similar result for efficiency and effectiveness presents in the Table 4 shows a significant difference between the studied group, $t(36) = -2.071$, $p < 0.05$ and $t(37) = -2.249$, $p < 0.05$ for the respective variables. Hence, this result supports hypothesis 2 and hypothesis 3. Student interactions also indicate a significant difference between type of learners in flipped classroom, $t(34) = -2.766$, $p < 0.01$, therefore hypothesis 4 is supported. However, a contrary result exhibits by student engagement, $t(50) = -1.083$, $p > 0.05$, hence, this study does not provide enough evidence to support hypothesis 5. Similar result indicates by final result, $t(50) = 0.373$, $p > 0.05$, where no significant difference was found between the groups. Therefore, this result also does not provide enough evidence to support hypothesis 6.

TABLE 4
A COMPARISON RESULT BETWEEN WEB ENHANCER LEARNERS AND BLENDED LEARNERS FOR POST TEST

Hypothesis	Variables	Levene's Test for Equality of Variance		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
H1	Satisfaction	0.791	0.378	-2.020	43.730	0.049*
H2	Efficiency	3.033	0.088	-2.071	35.780	0.046*
H3	Effectiveness	0.735	0.395	-2.249	36.910	0.031*
H4	Student Interactions	2.919	0.094	-2.766	34.444	0.009**
H5	Student Engagement	8.422	0.005	-1.083	50	0.284
H6	Final Result	5.203	0.027	0.373	50	0.710

* $p < 0.05$ ** $p < 0.01$

The study used quasi experimental method to collect data because the aim of this study is to understand whether the choice of exposures to online interactions in teaching and learning will have impacts on the students in flipped classroom. Six variables were chosen for this study namely satisfaction, efficiency, effectiveness, student interactions, student engagement and final results.

The finding of this study reveals that there is a significant difference between web enhancer learners and blended learners in flipped classroom where mean for the blended learners for all measured variables was higher when compared to web enhancer learners. Study conducted by Campbell, Gibson, Hall, Richards, and Callery (2008) found a significant difference in satisfaction between students who participated in the online discussion as compared to the face-to-face discussion. This study extend the finding from previous scholars, where online discussion among students promotes satisfaction in their learning. Clearly, online discussion improved students relationship with instructors (Campbell et al., 2008), in which relationship is a very important factor to influence satisfaction among students in blended learning (Yusoff, McLeay, & Woodruffe-Buron, 2015).

Study by Svendsen and Mondahl (2013) reported that online interaction between instructors and students enhance students' responsibilities in their own learning and participating in classroom activities. Online platform allows users to interact among themselves to complete their tasks more efficiently as compared to the traditional methods (Cook, Levinson, & Garside, 2010). The result from this study shows that there is a significant difference between groups that participated in online discussion in flipped classroom, where blended learners were more efficient as compared to the web enhancer learners.

Millennial generation has been exposed to the information technology and communication and very competent at using them. Study by Islam, Chittithaworn, Rozali, and Liang (2010) found that familiarity with the technology has a significant impact in the effectiveness of online learning. This literature clearly supported result from this study where exposing to the technology has significant difference among students in flipped classroom.

Student interaction is one of the variables measured in this study. The result shows that student interaction has significant difference among the groups. Student interaction has been identified as a very important predictor in blended learning (Islam et al., 2010; Yang, Newby, & Bill, 2008). Result from correlation studies found that student interaction has significant influence on satisfaction (Kuo et al., 2014) and effectiveness of blended learning (Islam et al., 2010).

Student engagement is considered a new area, however little is known about it in literatures for this area. Majority of student engagement studies focused on institutions rather than on students' perception (Robinson, 2012). However, student engagement attracts the researchers' interest in the area of faculty activities such as

mentoring system (Wright, 2012). This study reveals that there is no significant difference between web enhancer learners and blended learners. This situation happened because both groups were in the flipped classroom. The only difference was the density of online discussion approach to replace several face-to-face tutorial for blended learners.

The final result also appears to be insignificant difference between groups. Previous studies by Connolly, MacArthur, Stansfield, and McLellan (2007) found that students who participated in online learning performed better as compared to face-to-face students. Similar result reported by Davies and Graff (2005) asserted that students with high performance participated more in online discussion as compared to less performance students. However, most of previous studies compared between traditional learners and online learners. Whereas, this study focused on the differentiation of performance among students based online exposures. As noted by Creswell (2014) in the condition of experimentation in education, there are some competition levels between groups to outperform each other, thus making them to work hard in order to achieve their best individual result. This perhaps affect the significance of the result for hypothesis 6.

CONCLUSION AND RECOMMENDATION

This study is one of the premier studies that conducted using quasi-experimental for web enhancer learners and blended learners as proposed by Allen & Seaman (2010). The result indicates that there are significant differences between the treatment and control group for satisfaction, effectiveness, and efficiency and student interactions. This study contributes in the methodological and managerial aspects. This study uses a quasi-experimental method which allows a comparison between the various blended leaning approaches. Previous studies have focused on the traditional and on-line method whereas this method enable a better focus on the interaction among the online learners. In addition, the managers are able to design appropriate teaching and learning methods to cater for these blended strategies. However, this study has limited evidence to support that student engagement and final result have significant differences for the studied groups.

The authors suggest future researchers to conduct studies relating to flipped classroom in different setting such as training in the organization in order to enrich further understanding in this area. Further, future researchers may also include all types of learners as mentioned by Allen & Seaman (2010) in their studies based on the suitability of the setting and context.

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